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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/537,833	06/08/2005	Mikio Sakaguchi	1422-0678PUS1	8685

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EXAMINER
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KERNS, KEVIN P

ART UNIT	PAPER NUMBER
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1793

NOTIFICATION DATE	DELIVERY MODE
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03/18/2008

ELECTRONIC

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

mailroom@bskb.com

<b>Office Action Summary</b>	<b>Application No.</b> 10/537,833	<b>Applicant(s)</b> SAKAGUCHI ET AL.	
	<b>Examiner</b> Kevin P. Kerns	<b>Art Unit</b> 1793	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 26 December 2007.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-10 and 13-21 is/are pending in the application.  
4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-10 and 13-21 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 08 June 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☒ All    b) ☐ Some \*    c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)          | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

## **DETAILED ACTION**

### ***Claim Rejections - 35 USC § 102***

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

### ***Claim Rejections - 35 USC § 103***

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Art Unit: 1793

4. Claims 1, 2, 4, 7-10, 13, 15, and 18-21 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over JP 8-90150.

JP 8-90150 (see abstract) teaches the claimed casting including steel product produced by the claimed casting mold, wherein the casting mold (self-curing mold) is produced by spherical mullite based ceramic sand 8 containing 61.7 : 35.5 Ratio of  $\text{Al}_2\text{O}_3$  and  $\text{SiO}_2$  (see table 3) and size of 0.5–1.5mm, wherein the spherical degree of the mullite sand of less than 0.95 (index below 1.1, based on index one for the perfect sphere). Even the spherical mullite based ceramic sand 8 is not produced by the process of fusing in flame. However, the claimed sand and mold and casting and construction products are still obvious over JP 8-90150, because the spherical mullite based ceramic sand 8 has the claimed properties and after casting, casting molds are removed from the casting products.

5. Claims 3, 5, 6, 14, 16, and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP 8-90150 in view of Anzai et al. (US 4,923,520).

JP 8-90150 fails to teach the use of particular low water absorbency in specifying the molding sand (in claims 3 and 14), and fails to teach the use of fusing in flame (in claims 6 and 17).

However, Anzai et al. (col. 2, lines 66+) teach the use of fusion in flame process for the purpose of promoting fused silica having spherical degree of more than 0.99, or

Art Unit: 1793

99 volume percent, are in perfect spherical form (Anzai et al.; col. 4, lines 20+), and water absorption of about 0.21 wt% and less than 0.8 wt% (see Anzai et al., table 3).

It would have been obvious to one having ordinary skill in the art to provide JP 8-90150 the use of molding sand having low water absorbency in specifying the molding sand and the use of fusing in flame process, as taught by Anzai et al., in order to improve flowability and de-gassing (Anzai et al.; col. 1, lines 38+) and promote mechanical strength (Anzai et al.; col. 2, lines 64+).

Regarding claims 5 and 16, JP 8-90150 in view of Anzai et al. fail to teach the use of 50% of spherical molding sand. However, the use of 50% of spherical molding sand in the mixture of molding sand would have been obvious to one having ordinary skill in the art, in order to provide the mixed molding with improved flowability and de-gassing (Anzai et al.; col. 1, lines 38+) and promote mechanical strength (Anzai et al.; col. 2, lines 64+).

### ***Response to Arguments***

6. The examiner acknowledges the applicants' amendment received by the USPTO on December 26, 2007. The cancellation of claims 11, 12, 22, and 23 overcome the prior 35 USC 112, 2<sup>nd</sup> paragraph rejections. Claims 1-10 and 13-21 are currently under consideration in the application.

7. Applicants' arguments filed December 26, 2007 have been fully considered but they are not persuasive.

With regard to the applicants' remarks/arguments on pages 7-14 of the amendment, the applicants first argue (throughout pages 10 and 11) that JP 8-90150 allegedly fails to disclose "ceramic sand having a high spherical degree" (see last paragraph on page 10 of the remarks/arguments section). Although JP '150 was stated by the applicants to produce spherical sand via a different method, thus resulting in coarser particles (see top of page 11 of the remarks/arguments), JP '150 discloses the appropriate "spherical degree" as claimed by the applicants. Since the applicants' flame fusion method is within a product-by-process of claim 1, the spherical molding sand only requires the structural properties disclosed in claim 1, regardless of the process from which the sand was produced. As a result, the rejections under 35 USC 102/103 in view of JP 8-90150 remain. Regarding the 35 USC 103(a) rejections (see pages 12-14 of the remarks section), the examiner has provided Anzai et al. to disclose the fusion in flame process that is distinctly claimed (this process is required in claim 6, for example). As disclosed by Anzai et al., highly spherical (more than 0.99, where 1 is a perfect sphere) fused silica particles are produced by a fusing in flame process. Throughout pages 12 and 13 of the remarks/arguments, the applicants argue that the differing particle sizes of JP '150 and Anzai et al. would result in an inferior product (molding sand) when their teachings would be combined. The examiner respectfully disagrees, as this argument generally attacks each reference individually, rather than what one of ordinary skill in the art would have recognized upon their teachings in combination (also see motivation to combine in the above 35 USC 103(a) rejections section). Furthermore, it would have been "obvious to try" the fusing in flame process to

produce nearly perfectly spherical particles over a range of particle sizes, as such a method would result in the desired spherical shapes regardless of size. *KSR Int'l Co. v. Teleflex Inc.*, 82 USPQ.2d 1385 (S.Ct. 2007). In response to applicants' arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

### ***Conclusion***

8. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dr. Kevin P. Kerns whose telephone number is

Art Unit: 1793

(571)272-1178. The examiner can normally be reached on Monday-Friday from 8:00am-5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy King can be reached on (571) 272-1244. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Kevin P. Kerns  
Primary Examiner  
Art Unit 1793

/Kevin P. Kerns/  
Primary Examiner, Art Unit 1793  
February 28, 2008